

We Claim:

Claim 1. A method of treating an esophageal lesion by inserting an inflatable balloon within the esophagus, said esophagus having a wall portion, the method including:

placing an optical fiber in said balloon

inflating said balloon; and

transmitting laser energy through said fiber within said balloon to effect laser radiation treatment of a lesion on said wall of the esophagus adjacent said balloon.

Claim 2. The method of Claim 1 including:

inflating said balloon with a fluid.

Claim 3. The method of Claim 2 including:

cooling said fluid in said balloon.

Claim 4. The method of Claim 2 including:

removing said fluid from said balloon.

Claim 5. The method of Claim 2 including:

treating said lesion by a light transmitted through a wall of said balloon.

Claim 6. The method of claim 1, including:

emitting said laser radiation through a wall of said inflated balloon.

Claim 7. The method of claim 2, including:

filling said balloon with a laser light-dispersal fluid.

Claim 8. The method of claim 1, including:

visualizing said lesion through a scope arranged in said balloon.

Claim 9. The method of claim 1, including:

articulating said fiber to direct laser light on a wall of said balloon and said wall of said esophagus.

Claim 10. The method of claim 1, including:

placing said balloon on a distal end of an endoscope.

Claim 11. The method of claim 1, including:

placing an endoscope within said balloon.

Claim 12. The method of claim 10, including:

inserting said endoscope into an esophagus to be treated.

Claim 13. The method of claim 10, including:

inflating said balloon with a pressurized fluid to expand said balloon against said wall of the esophagus.

Claim 14. The method of claim 10, including:

placing a plurality of laser fibers through said endoscope for treatment of said lesions in the esophagus.

Claim 15. The method of claim 11, including:

purging the esophagus by inflating said balloon against said wall of the esophagus to permit treatment thereof.

Claim 16. The method of claim 1, including:

steering said fiber towards a lesion of the esophagus.

Claim 17. The method of claim 2, wherein said fluid is a liquid or a gas.

Claim 18. The method of claim 17, wherein said liquid is saline.

Claim 19. The method of claim 1, wherein said balloon has an optically transparent wall.

Claim 20. The method of claim 19, wherein said optically transparent wall of said balloon is in a distalmost position of said balloon.

Claim 21. The method of claim 1, wherein said balloon has a distalmost end having a transparent window thereon.

Claim 22. The method of claim 1, wherein said laser generates a laser light wavelength of about 520-650 nm and a pulse width of about 0.2-100 ms.

Claim 23. The method of claim 22, wherein said laser has an energy of about 0.5 to about 8.0 joules and repetition rates of about 1-10Hz.

Claim 24. Apparatus for the treatment of esophageal lesions, including:

an inflatable balloon for insertion into the esophagus;

an endoscope for receipt of said balloon and introduction of said balloon into the esophagus;

an optical fiber apparatus for insertion within said balloon in the esophagus; and

a balloon inflation/deflation means in fluid communication with said balloon for inflating and emptying said balloon of a fluid.

Claim 25. The apparatus as recited in claim 24, wherein said fiber apparatus is a side emitting laser fiber.

Claim 26. The apparatus as recited in claim 24, including a sheath for supporting said endoscope.

Claim 27. The apparatus as recited in claim 24, wherein said optical fiber apparatus is movable and steerable.

Claim 28. The apparatus as recited in claim 23, including a laser light source generating a laser wave length of about 520-650 nm, and a

pulse width of about 0.2-100 ms, and a laser energy of about 0.5 to 8.0 joules and repetition rates of about 1-10 Hz.

Claim 29. The apparatus as recited in claim 24 having a portion thereof radio-opaque so as to be visible under fluoroscopy.

Claim 30. Apparatus for the treatment of esophageal lesions, including:

- an endoscope for insertion into the esophagus;

- an occlusion device movably arranged in a distal end of said endoscope for temporarily occluding a lower portion of said esophagus; and

- a laser fiber apparatus movable arranged through said distal end of said endoscope.

Claim 31. The apparatus as recited in claim 30, wherein said occlusion device comprises an umbrella-like member which is openable and closable by control means arranged through a lumen in said endoscope.

Claim 32. The apparatus as recited in claim 30, wherein said occlusion device comprises an inflatable balloon which is inflatable and deflatable through a microcatheter arranged through a lumen in said endoscope.

Claim 33. The apparatus as recited in claim 30, wherein said occlusion device comprises a biodegradable or digestible material disposably arranged on the distal end of said endoscope and into a lower end of said esophagus.

Claim 34. A method of treatment of Barrett's esophagus, including:

inserting an endoscope for insertion into the esophagus;

arranging an occlusion device movable in a distal end of said endoscope for temporarily occluding a lower portion of said esophagus distal to a treatment area therein;

moving a laser fiber apparatus through said distal end of said endoscope; and

aiming and energizing said laser via a laser delivery fiber onto a lesion on a wall portion of said esophagus.

Claim 35. The method as recited in claim 34, wherein said occlusion device comprises an umbrella-like member which is openable and closable by control means arranged through a lumen in said endoscope.

Claim 36. The method as recited in claim 34, wherein said occlusion device comprises an inflatable balloon which is inflatable and deflatable through a microcatheter arranged through a lumen in said endoscope.

Claim 37. The method as recited in claim 34, wherein said occlusion device comprises a bioabsorbable or digestible material disposed from said distal end of said endoscope and into a lower end of said esophagus.